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ABSTRACT

Several treatment approaches to cigarette smoking were investigated, including a nicotine fading procedure in which subjects changed their cigarette brand each week to one containing progressively less nicotine and tar; a self-monitoring procedure in which subjects plotted their daily intake of nicotine and tar; a combined nicotine fading/self-monitoring procedure; and a slightly modified American Cancer Society Stop Smoking Program. Smokers (N=40) were assigned to one of the treatment programs. Results at the six-month follow-up showed that the nicotine fading/self-monitoring treatment was the superior procedure on all dependent measures: abstinence rate (50%), daily nicotine intake (69% reduction from baseline), daily tar intake (71% reducation from baseline). While the combined treatment program produced success rates in the range of those obtained by the aversive rapid smoking procedure (the most successful procedure to date), the nonaversive combined program did not share some of the inherent limitations of the aversive procedure. Results suggest that the nicotine fading/self-monitoring approach may be a more reasonable treatment for persons with heart disease, emphysema and asthma, and may hold promise for the more general cigarette smoking population as well. (Author)

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The Use of Nicotine Fading and Self-Monitoring to Reduce Cigarette Smoking: A Non-Aversive Procedure

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Evidence strongly suggests that the drug nicotine is playing a central role in the widespread phenomenon of cigarette dependence. Perhaps the major proponent of this argument has been Michael Russell at the Addiction Research Unit of the Institute of Psychiatry in London, who has stated that "tobacco smoking is a form of drug dependence different but no less strong than that of other addictive drugs" (Russell, 1976, p. 1). While almost all treatment strategies to date have considered psychological and/or environmental factors that maintain cigarette smoking, few have included a consideration of the pharmacological factors involved in tobacco dependence.

Today I will be reporting a study which tested a novel, non-aversive, nicotine fading/self-monitoring treatment procedure designed to provide for a gradual withdrawal from the drug nicotine.

Method

The study was conducted in Baltimore, Maryland, where subjects were recruited from the community via radio, newspaper, and poster advertisements. Only persons who had smoked cigarettes for at least one year, who smoked at least a pack a day, and whose regular brand contained at least 0.7 mg. nicotine were accepted as subjects in this study.

Forty-four smokers, 15 males and 29 females, were originally admitted to the program. They ranged in age from 17 to 62, with a mean age of about 31 years. They had been regular cigarette smokers for between 1 and 45 years, with the mean falling just above 14 years. Exactly one-half of the subjects were university students, while the other half were local community residents. All subjects were matched on the basis of their daily nicotine intake and then randomly assigned to one of four treatment groups.

In the nicotine fading group, subjects changed their brand of cigarettes each week to one containing progressively lower nicotine and tar, in decrements of 30, 60, and 90% -- that is, in successive weeks, they changed to brands containing 30, 60, and 90% less nicotine than their baseline or regular b and of cigarettes. Since there is a .96 correlation between the nicotine and tar contents of today's cigarettes, these changes represent equivalent reductions in tar intake. At the end of these four weeks, subjects were to quit cold turkey.

The second group was a self-monitoring condition in which subjects were to plot their daily intake of nicotine and tar, on two separate graphs, throughout the four week treatment program. These people were not told to change their brand of cigarettes, although this did not preclude their doing so spontaneously.

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The third group was a combined nicotine fading/self-monitoring condition, in which subjects changed their weekly cigarette brand to a progressively lower nicotine and tar brand (as in the nicotine fading condition), while they also plotted their nicotine and tar intake each day (as in the self-monitoring group).

Finally, the fourth group was a slightly modified, American Cancer Society Stop Smoking Program, designed to inform smokers about the health hazards of smoking and about the process of quitting. The program is intended to help smokers discover why they smoke, and to quit, using the support of a group. Thus, while the American Cancer Society group was designed, in a sense, to "control" for the effects of the nicotine fading and/or self-monitoring procedures, it was an "active" treatment group rather than an attention-placebo or no-treatment control group.

I should mention here that all the treatments were conducted in groups. Each of the four treatment groups met for five consecutive, 1-hour weekly sessions. All sessions were conducted by the senior author, an ex-smoker and second-year graduate student in clinical psychology. All treatment sessions were conducted so as to maximize nonspecific factors such as group support, therapist contact, social reinforcement, induced positive expectations, and monitoring.

Results

The results showed that after 6 months, the combined nicotine fading/self-monitoring group achieved a 50% total abstinence rate -- five of the 10 subjects in that group had quit smoking. The nicotine fading and American Cancer Society groups achieved only 10% abstinence (one of 10 subjects quit), while no one in the self-monitoring group quit smoking.

The combined nicotine fading/self-monitoring group also achieved superior rates on all three of the percentage-of-baseline measures: nicotine intake, tar intake, and cigarettes smoked. In the combined treatment group, the mean daily nicotine intake was reduced from almost 19 mgs. during the baseline period to slightly under 6 mgs. at the 6-month follow-up; a 69% reduction. The mean daily tar intake in the combined group was comparably reduced from 273 mgs. to 80 mgs.; a 71% reduction. Cigarette consumption in this group showed a 32% reduction from baseline, from a mean of 18 daily cigarettes smoked to about 12 at the 6-month follow-up. The second lowest rates across all three dependent measures were achieved by the nicotine fading group, followed respectively by the American Cancer Society and self-monitoring groups.

Discussion

Initial results using this relatively simple, nicotine fading/self-monitoring procedure look promising: after 6 months, five of 10 subjects were totally abstinent. This study awaits replication to determine whether these results, based on a rather small sample, can be achieved reliably with other groups of dependent smokers. The procedure does have the added advantage of being nonaversive: thus, it does not share some of the inherent limitations of the aversive control procedures, and can be employed without concern for potential health risks to the consumer. This means that nicotine

fading/self-monitoring can be used to treat smokers at medical risk; those with pulmonary and cardiovascular disease, emphysema, and asthma, as well as the more general smoking population.

The combined treatment procedure has another advantage, in that it provides for an alternative treatment goal for those unable to quit; that of "controlled smoking". Smokers need only keep smoking a lowered T/N brand, in order to achieve significant reductions in tar and nicotine intake. Michael Russell, among others, has proposed "acceptably safe, light to moderate, controlled smoking" (undated, p. 8) as a more feasible treatment goal, given the long-standing failure of smoking interventions to produce long-term cigarette abstinence. Similar reasoning has led to success in treating alcoholics via a controlled "social drinking" approach. This goal appears to be a reasonable one for smokers, in light of the results of a 12-year American Cancer Society study (Hammond, Garfinkel, Seidman, & Lew, 1976) which show that smokers of low T/N cigarettes are less likely to die of lung cancer and coronary heart disease than are high T/N brand smokers. The 65% overall group reductions in nicotine and tar intake attest to the fact that a fair degree of controlled smoking was achieved using this treatment approach. Significantly, all 5 of the nonabstaining subjects in the NF/SM group had changed to a lower T/N cigarette brand at the 6-month follow-up.

A 1974 Gallup report suggests that about half of the current cigarette smoking population (30 million people) would like to quit, but have been unsuccessful in their unaided efforts to do so. It seems reasonable to assume that many of these smokers, and indeed many of those who seek formal treatment, are initially lacking confidence in their ability to quit smoking. I'd like to engage in a little speculation here, and suggest that the present strategy may be particularly effective for such smokers. The NF/SM treatment can be seen as a sequential process where smokers invariably reduce their nicotine and tar intake (over a number of weeks), while keeping informed of these changes as they occur. Smokers need only change cigarette brands in order to achieve these reductions, while plotting tar and nicotine intake insures that they will be kept aware of their inevitable success. Thus the procedure is simple, relatively painless, and can be seen as containing a "built-in success mechanism".

In behavioral terms, the self-monitoring behavior of the smokers serves as a conditioned reinforcer, thereby increasing the probability that the target response -- smoking reduction -- would occur in the future. This conditioned reinforcer may take the form of an internal event such as "feeling better," and may gradually serve to bring about a more generalized feeling of confidence regarding one's ability to quit smoking. This is quite similar to Albert Bandura's explanation of what he has called a "self-efficacy mechanism." Conversations with successful subjects in the combined treatment group suggest that this type of mechanism may have been operating -- that is, after initially doubting their ability to quit smoking, they began to "see" their success and to believe that they could really succeed in quitting this time.

Thus, the results of an initial test of the nicotine fading/self-monitoring treatment approach appear promising, both in terms of controlled smoking and total abstinence. The procedure has the added advantage of

being nonaversive, and thus can be utilized with cigarette smokers most in need of treatment: those suffering from heart disease, emphysema and asthma. The approach appears to be particularly effective for those smokers who are initially lacking in their ability to quit smoking. Finally, NF/SM is a relatively simple, structured procedure which could be adapted for self-administration, either in a treatment setting or perhaps more importantly, in the home.

Attempts to replicate these findings have been undertaken, and initial results look encouraging. Future research might concentrate on increasing the effectiveness of the present treatment approach by combining it with other compatible approaches, such as self-control and stimulus control procedures. Finally, the present treatment procedure needs to be incorporated with effective maintenance procedures, to insure that much of the success achieved during the treatment process will not be reversed during the months following treatment.

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